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ABSTRACT

The purpose of this research was to develop an evaluation technique to assess how effectively children develop as independent learners within classrooms implementing the Tucson Early Education Model. A situational task was chosen in order to gather information about the ongoing open classroom. The Classroom Attitude Observation Schedule was developed to detect pattern shifts in selected process variables in a classroom during the absence of the teacher and other "controlling" adults. The variables are grouping patterns, classroom activities, and inappropriate behaviors. A pilot study of the CAOS was conducted, using six experimental (TEEM) classrooms and two comparison classrooms. The summary dependent variables were mean group size, mean number of children engaged in an activity, inappropriate behavior, mean number of groups, mean number of activities. The summary activity categories were traditional academic activities, nontraditional cognitive learning activities, play and role playing, snacks and management, and nonfocused activities. Results showed the CAOS sensitive to pattern shifts. The clearest shift appeared with levels of inappropriate behavior. Children in comparison classrooms displayed more inappropriate behavior during teacher absence than did children in the TEEM classrooms. There were significant differences between teacher absence and teacher presence in Comparison classrooms but not in TEEM classrooms. The size of groups in which children clustered themselves changed significantly when the teacher was not present. (KM)

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DEVELOPMENT OF SITUATIONAL TASK METHODOLOGY FOR THE EVALUATION OF PROCESS OUTCOMES IN THE OPEN CLASSROOM

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INTRODUCTION

The research reported here is a part of the continuing program of development, field delivery, and evaluation of the Tucson Early Education Model (TEEM), a participant program in the planned variation study of Head Start and Follow Through since 1967. The TEEM was first developed to respond to the educational needs of low-income Mexican-American children in the public schools of Tucson, Arizona. With the inception of massive Federal funds to support innovative educational programs in the late '60's, the U.S. Office of Education introduced a longitudinal research and development program to find out which of many competing early education systems were most efficacious in impacting on the educational performance of low-income children. This study consisted of selecting over 150 cities in the country that sought high-quality early childhood programs for their low-income children, and matching these school systems with over 25 different educational modelers who delivered their educational package to selected local classrooms. The implementation of these programs has been accompanied by an extensive evaluation thrust, with both a massive collection of data on the national level, as well as discrete evaluation studies by program modelers and community staff.

This particular research is part of a systematic study of the TEEM program in terms of outcome variables not easily measured by our current armamentarium of research tools.

PROGRAM DIMENSIONS

The Tucson Early Education Model is a process-oriented educational system with four areas of program objectives for children: Language Competence, Intellectual Base, Motivational Base, and, Societal Arts and Skills (Arizona

Center for Educational Research and Development, 1972). These goals areas are met through an integrated classroom environment which emphasizes the orchestrated development of behaviors in children. Other process variables focus on individualization of instruction, the provision of a classroom environment that provides gratification for children, and use of modeling procedures to facilitate children's learning. This emphasis on a process approach to learning, as well as the focus on the whole child, lead to the description of the TEEM as an open classroom program (Newsweek, May 5, 1971).

Among the many cited goals for children as a result of participation in an open-classroom environment, one of the most commonly noted is that children become independent, self-directed learners. This involves the ability to seek out learning materials and tasks, and to proceed in productive learning relatively independent of adult direction or control. Our task then was to develop a systematic way to assess the independence of child learning within the ongoing classroom environment. Additional direction was offered through a review of literature about the Follow Through Planned Variation Study, as summarized by Maccoby and Zellner (1970) in their text Experiments in Primary Education. In a discussion of the different conceptualization of the relationship between children's motivational set and thier classroom learning, they conclude:

> "To our knowledge, evaluation procedures comparing the effectiveness of the various (Follow Through) programs have not attempted to assess how self-sustained the children's learning actually is. It would be possible to actually watch to see what happens when the teacher goes out of the classroom--whether the children find something to work on, or whether they sit passively or engage in horseplay. This has not yet been done in any way." (p. 75).

Such comments set the wheels in motion. The goal became to develop an observational paradigm that would permit an assessment of children's independent learning behavior through setting up a situation where the teacher was absent

from the classroom. This would provide a test of the "ego-strength" of children's learning commitment when the implicit adult authority was not present.

METHODOLOGICAL REVIEW

The task of the research presented here was to develop an evaluation technique to assess how effectively, indeed, children do develop as independent learners within classrooms implementing the TEEM. A review of available literature indicated no extant studies with an adequate methodology to research "independent learning behavior" (Simon and Boyer, 1970). This led to a review of available observational research techniques with a view toward developing a totally new technique, or modifying existing procedures to this end. At this point certain minimal criteria were set to develop a novel evaluation technique. The following criteria were set: 1) the technique should reflect actual behavior of children; 2) it should be unobtrusive; 3) it should be valid with children from preschool through grade 3.

We decided on the development of a situational task, that would provide information about process goals in the open classroom. A situational technique gathers information within an ongoing classroom setting, so that the information reflects the real-world behavior of children and teachers. An additional feature is the introduction of environmental manipulation which put performance demands on the classroom members. Such events as fire drills or visitors naturally occur in all classrooms. In this research technique, quasi-natural events are simulated and used as opportunities to collect observational data on the continuing behavior of classroom participants.

Situational tasks were described by Grimmett (1970) as useful procedures to assess the effects of experimental programs on the attainment of connative and motive behaviors in children. She notes the inadequacy of traditional

paper-and-pencil techniques for gathering information in these crucial areas of child development. A situational task (which she calls "situational test", 1970) is defined as "a condition requiring an actual, adaptive response, rather than a mere 'test' response ... (and) ... problem confrontation, the resolution of which has some relevance for the 'real world'" (p. 12). These techniques are especially appropriate for assessing children's social performance within the context where it was learned (i.e., in the classroom).

CLASSROOM OBSERVATION TECHNIQUES

Systematic observation of social interaction has only recently achieved respectability as a tool in educational research. Initial work by White and Lippitt (1960) and Flanders (1966) indicated the potential of observational methods to gather information on previously unresearched variables of classroom process. This research method has been widely developed now, as indicated by the voluminous reviews incorporated in the Mirrors for Behavior monographs (Simon and Boyer, 1970). One of the directions pursued by the U.S. Office of Education in the longitudinal research study of the Follow Through program was the development of an observational system specific to the need to evaluate the Follow Through program at the national level. This technique, called Classroom Observation Instrument, gathers information about the nature of classroom interaction, the type of activities and group patterns, and the quality of the physical plant (Stallings, 1972). Classrooms are observed over a three day period, for a total of 36 five-minute interaction sequences. A review of this procedure indicated certain features that would be adaptable to the task of assessing independent learning behavior in children. With the encouragement of COI developers, we built upon their initial instrument to meet our research goal.

The Classroom Attitude Observation Schedule has been designed to detect pattern shifts in selected process variables in a classroom during the absence of the teacher and other "controlling" adults. These variables are grouping patterns, types of classroom activities, and the occurrence of inappropriate behaviors. In order to investigate these patterns, the observation is divided into three phases. During the first twelve minutes (called Baseline phase), observer records the activities of adults and children on the CAOS schedule; during the second twelve minutes (called Teacher Absent phase), the observer records the activities of children while the teacher figures are absent; during the third twelve minutes (called Reinstitution phase), activities of both children and the returned teaching figures are recorded. The total CAOS observation takes 36 minutes, and is described in Figure 1.

Insert Figure 1 about here

The observational technique counts children and adults engaged in the various classroom activities on a time-sample basis. All types of activities presumed to take place in the classroom are listed on the recording form (see Figure 2). Once every two minutes a clockwise visual scan is made of the room by the observer. The observer remains stationary throughout the thirty-six minute period, as the scan begins and ends at the same point for each scan. Numbers of children and adults observed during that scan are placed in the appropriate cell, thus retaining grouping patterns in the recording. If inappropriate behavior is observed during this scan, it is also noted by its associated activity and in the appropriate two-minute scan period. Two more scans are made during the two-minute period to pick up incidents of inappropriate behavior, once at the end of the first minute, and again at the end of a minute and-a-half.

Procedures and categories from two previously developed instruments were synthesized to produce this particular procedure. Both of the parent procedures have been field tested and found reliable.

One of the two instruments (as noted earlier) was developed by Stanford Research Institute. It is an interaction observation technique developed for National Head Start and Follow Through evaluation efforts, called Classroom Observation Instrument (Stallings, 1972). As a preamble to each five-minute interaction recording period, the observer takes a "snapshot" which gives the foundation for the CAOS technique. Activity definitions used by SRI have been redefined to make them more program specific to the Tucson Early Education Model.

SRI found this snapshot portion of their procedure highly reliable (better than 90% over thirty trainees in a stationary test situation) and the training of observers relatively simple.

The other parent instrument was developed at the Arizona Center and is called the Schedule for Incompatible Learning Behavior (SILB) (Grimmett, Underwood and Brackney, 1970). It was originally developed for a study assessing the relationship of behavior settings to disruptive or inappropriate behavior. The inappropriate behaviors selected for coding in CAOS are:

Hitting
Interfering
Throwing
Yelling
Leaving room without permission

These categories were developed and operationalized in consultation with classroom teachers. Initial studies indicated that these categories could be reliably rated by trained observers.

The population of behavior to be sampled from the TEEM classes with CAOS was that occurring during child selection time in all classrooms. This is the time when children choose their own activities from those available in

the classroom. The decision to standardize procedures on this free choice time stemmed from a combination of reasons, the most important being that the behavioral setting must be consistent across all classrooms. Secondly, this was the time when children had the greatest latitude in setting their own tasks for independent learning.

Initial observer training consisted of a review of categories and their definitions, and practice coding by both observers in the same classroom, without the manipulative phase. After practice coding, the two observers met to compare coding and isolate trouble spots. When definitions were not clear, they were re-worked until both observers could agree on their meaning and observability. The observers achieved reliability, with average agreement of 82%, and a high of 91% (Scott's pi; see Flanders, 1966). It was felt that this was high enough to permit comparability of observations made by the observers in separate observations. The CAOS observation schedule is seen in Figure 2.

PILOT STUDY

Our initial development effort indicated that the CAOS procedure was sufficiently developed to be utilized in a field research study. This opportunity was afforded through a commitment to investigate the Planned Variation Head Start program. The Arizona Center was awarded a grant to intensively evaluate the operation of the TEEM Head Start in field operation (Rentfrow, Durning, Conrad and Goldupp, 1972). The CAOS was incorporated into a multifaceted design that also included child tests, teacher ratings, and family demographic data.

The study was carried out in a middle-sized community in the Great Plains. This community had a total of eight classrooms operating in their

Head Start program, six of which used the TEEM model, and two using locally-implemented curriculum. Thus, a research design, using six experimental, and two comparison classrooms, was implemented. In the classrooms, over 90% of the children were Anglo, as were the two research staff who did the CAOS observations. A total of eight classrooms was observed during the Spring of 1972, and each received one CAOS observation.

INITIAL ANALYSIS[1]

The purpose of the CAOS pilot study was to discover pattern shifts given the absence of classroom "controlling" adults. Such shifts could take many forms. The variables described below are those that might demonstrate controls which are largely adult centered versus controls internalized by the children or imposed by the physical or behavior setting. A meaningful pattern would be one in which the variable increases or decreases during teacher absence and returns to the level exhibited during Phase A, when teacher returns in Phase C. A stable pattern, then, would be one in which all three phases look much alike. Three principal questions were being asked.

1. Are there differences between observation phases on any of the summary variables?
2. Is there a difference between TEEM and Comparison classrooms?
3. Is there interaction between classroom assignment and observation phase? (Goldupp, 1972).

To analyze the data, a two by three factorial design was used. One independent variable used was classroom assignment (TEEM and Comparison). The

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[1]This information is adapted freely from another paper entitled "An Investigation of Independent Child Behavior in the Open Classroom: The Classroom Attitude Observation Schedule" by Ocea Goldupp. This paper is available for 50¢ from: Information Officer, Arizona Center for Educational Research and Development, University of Arizona, 1515 East First Street, Tucson, Arizona 85719.

other independent variable was observation phase (Phases A, B, and C). Phases were treated as repeated measures on the same subjects. This analysis was repeated using each of the five summary variables as the dependent variable.

The summary dependent variables were:

1. Mean group size
2. Mean number of children engaged in an activity
3. Inappropriate behavior
4. Mean number of groups
5. Mean number of activities

Mean group size was calculated by dividing total number of children counted in a twelve-minute phase by the number of groups counted in that phase. Mean number of children engaged in an activity at any one time during the twelve-minute phase was calculated by dividing the total number of children counted in a phase by the number of cells used in the phase. Inappropriate behavior was simply a total count of incidents of inappropriate behavior observed during the twelve-minute phase. Mean number of groups was calculated by dividing number of groups counted in a phase by number of two-minute scans in the phase. (In all but two instances, there were six scans for every phase). Mean number of activities was calculated by dividing number of activity cells used in a phase by number of two-minute scans in the phase.

Another analysis used independent ratings of teachers. The Lincoln Head Start Director was asked to rate all of the teachers on level of implementation of the TEEM. The scale was a Likert Form with 1 to 9 levels. The lowest teacher rated was a "2' and the two highest were "6's". Since these ratings were assigned independently of the variables examined for CAOS, one high-rated teacher was selected at random from the two high rated teachers

and was compared with the low rated teacher on the variable showing greatest variation in CAOS in group data (i.e., inappropriate behavior) (see Figure 3).

For further examination of the data, activity categories were collapsed into five summary categories.

> Type I consists of "traditional" academic activities and includes arithmetic, language, social studies and science.
>
> Type II consists of cognitive learning activities for young children but not in the "traditional" sense. Included in this type are stories, games, puzzles, arts, crafts, cooking, and building.
>
> Type III consists of play and role playing.
>
> Type IV consists of snacks and management. Management activities are those involved in managing the room, including cleaning up, handing out materials, and going after supplies.
>
> Type V consists of non-focused activities such as transitional activities, children out of the room, and wandering.

These five activity types were used to examine the proportion of time spent by adults and children in each activity during Phases A and C combined. These data were examined with Spearman RHO rank order correlation comparing the same high-rated classroom and low-rated classroom.

Table 1 shows the results of analysis of variance of each of the five summary variables. Analysis of the first summary variable, mean group size, indicated that differences among phases were significant ($p<.10$). There was no significant difference between classroom styles.

The most conspicuous difference appeared with the second summary variable, inappropriate behavior. Analysis of this variable indicated that significant differences existed in both independent variables, group and phase, as well as the interaction between these variables (group: $p<.10$; phase: $p<.001$; group by phase: $p<.05$). Figure 3 gives graphic demonstration of the group-by-phase interaction.

Further analysis of these summary variables was conducted using the Newman-Keuls post hoc test. Since cell sizes were unequal the harmonic mean

of cell n's was used as an estimate of n (Winer, 1962). Alpha level for this test was set at .05. The teacher absent phase in Comparison classrooms was significantly different from every other cell. No other significant differences were found.

No significant F-ratios were obtained for the other three summary variables tested, mean activity size, mean number of groups, and mean number of activities.

When proportion of adult participation in each of the five activity types was compared to proportion of child participation in the same activity types during the same phases, rank order correlation between adult participation and child participation in the low rated classroom was -.27 (Figure 4). In the high rated classroom, the correlation between adult and child participation was .80 (Figure 5).

CONCLUSIONS

The CAOS system is clearly sensitive to pattern shifts in some aspects of child behavior. The clearest pattern shift appeared with levels of inappropriate behavior. Children in the two comparison classrooms displayed more inappropriate behavior during the teacher absent phase than did the children in TEEM classrooms. The post hoc tests demonstrated no significant differences between level of inappropriate behavior in TEEM classrooms and Comparison classrooms during the teacher present phases. The differences between these two groups during teacher absent phase was significant ($p<.05$).

Within the TEEM classrooms, children in the classroom rated lowest by the Head Start Director displayed more inappropriate behavior during teacher absence than did children in the high-rated classroom. It also held true there were significant differences between teacher absent and teacher present

phases in Comparison classrooms, while there were no significant differences between phases in TEEM classrooms. These comparisons also appeared to exist between the low-rated and the high-rated classroom.

The system picked up other indications of shifting patterns during teacher absence.[2] One which was statistically significant was the area of mean group size. The size of groups in which chidren clustered themselves changed significantly when the teacher was not present. The difference demonstrated by this variable was significant when all eight classrooms were examined across phases. There were no significant differences between TEEM classrooms and Comparison classrooms on this variable.

NEW DIRECTIONS

The development and pilot utilization of the CAOS procedure in Head Start classes indicated the potential of the technique for both formative and summative data collection purposes. This has led to a current effort to collect CAOS in a nationwide sample of 40 classrooms using the TEEM in the Follow Through program. Initial inspection of fall data indicates that the techique is likewise sensitive to ongoing classroom process with older children. Another data set is being collected this Spring to analyze the sensitivity of CAOS to change in classrooms over a school year. This information will be reported next year at this time.

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[2] Alpha level was set at .10 for this initial analysis, since the study was a pilot.

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Table 1

Comparison of TEEM x Comparison Classrooms across Phases for Selected CAOS Observation Summary Variables

Summary Variable	Source of Variance	df	MS	F
Mean Group Size	Group	1	.0057	.03
	Phase	2	.1700	3.81*
	Group x Phase	2	.0380	.85
Inappropriate Behavior	Group	1	193.3889	20.80**
	Phase	2	139.8750	14.36***
	Group x Phase	2	131.3472	13.48**
Mean Activity Size	Group	1	.2358	.66
	Phase	2	.7926	2.46
	Group x Phase	2	.2457	.76
Mean Number of Groups	Group	1	3.2939	2.34
	Phase	2	.0870	.06
	Group x Phase	2	1.2156	.81
Mean Number of Activities	Group	1	3.3153	1.61
	Phase	2	1.7060	2.54
	Group x Phase	2	.4335	.65

*p<.10.
**p<.05.
***p<.001.

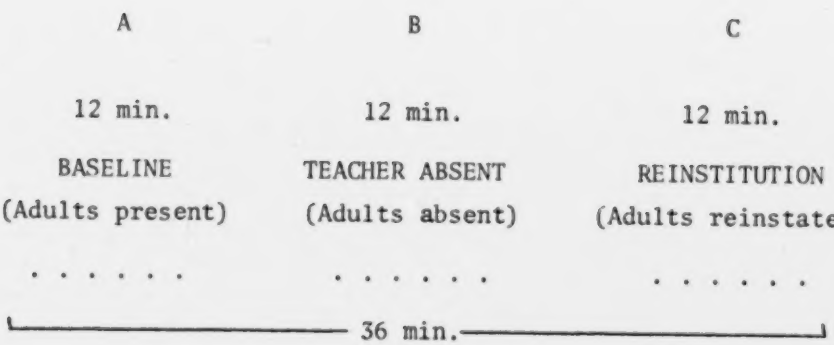

Figure 1. Phases of CAOS

CLASSROOM ATTITUDE OBSERVATION SCHEDULE (CAOS)

page___of 3

Teacher_____ School_____ Community_____ Date_____ Observer_____ Time Started_____

	N.I.	I.A.	N.I.	I.A.	N.I.	I.A	N.I.	I.A.	N.I.	I.A.	N.I.	I.A.	Total
A. Snack Lunch													
B. Group time													
Story/Sing Dance/Music													
C. Arith/Math Numbers													
Reading/Alpha Lang. Devel.													
D. Soc. Studies Geography													
Science Nat. World													
E. Games Puzzles													
F. Arts Crafts													
Sew/Cook Pound/Saw													
G. Blocks Trucks													
Dolls/Dressup Playhouse													
H. Play													
I. Transitional activities													
J. Classroom management													
K. Out of room													
L. Observing Other													
M. Wandering													
Totals													

N.I. = Number Involved
I.A. = Inappropriate Activity

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Figure 2. CAOS Recording Form

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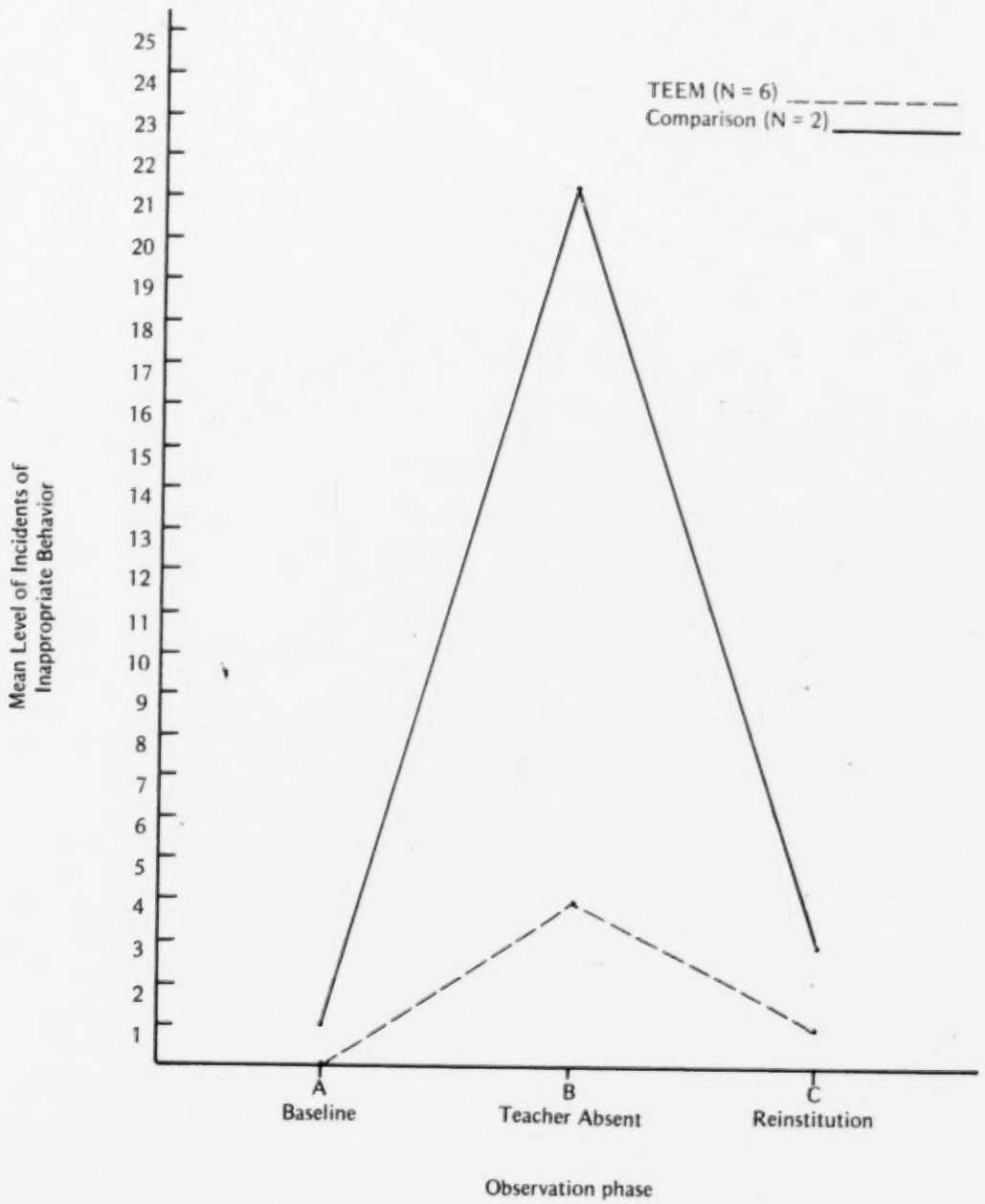

Figure 3. Incidents of Inappropriate Learning Behavior in TEEM and Comparison Classrooms across Observation Phases.

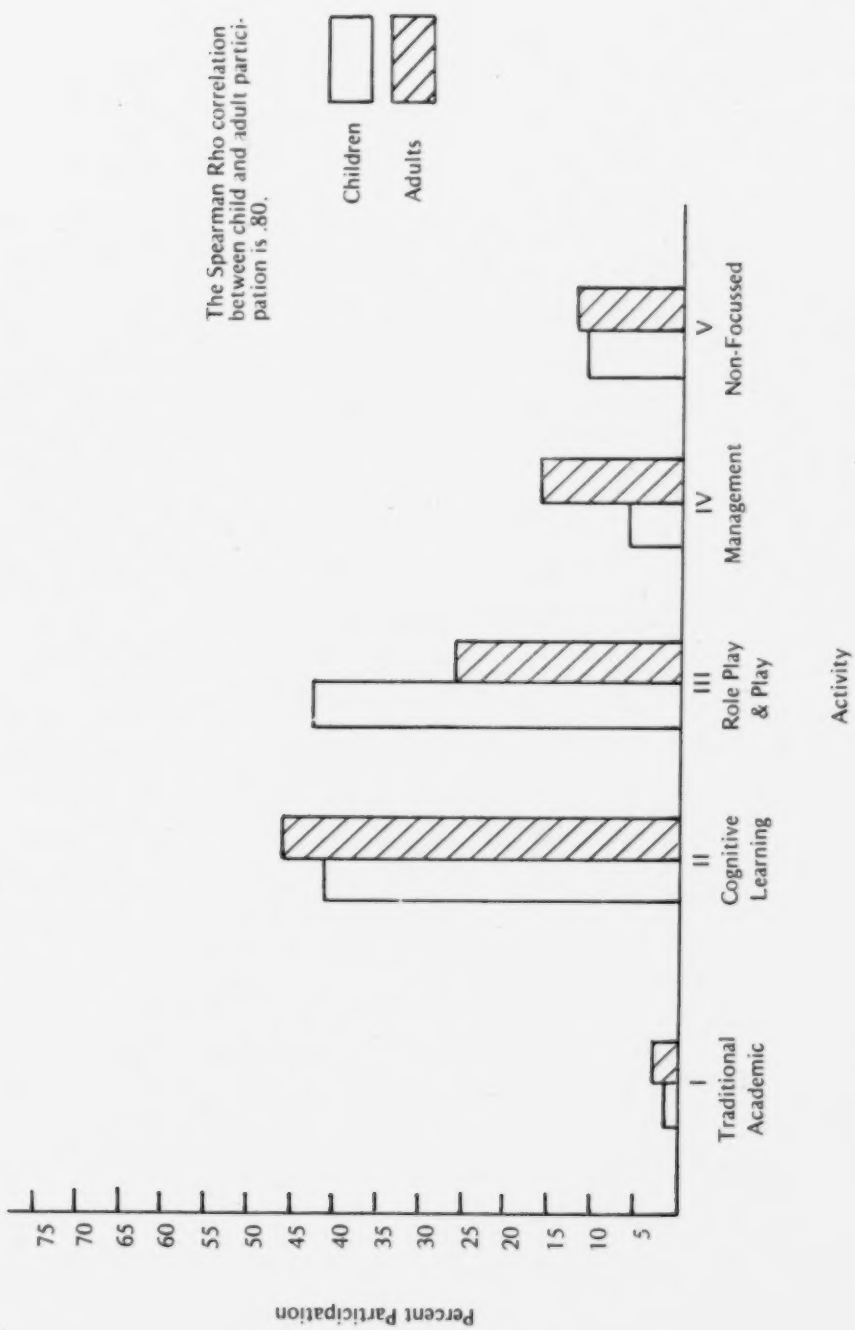

Figure 4. Location of Adults and Children by Activities in High Rated Classroom.

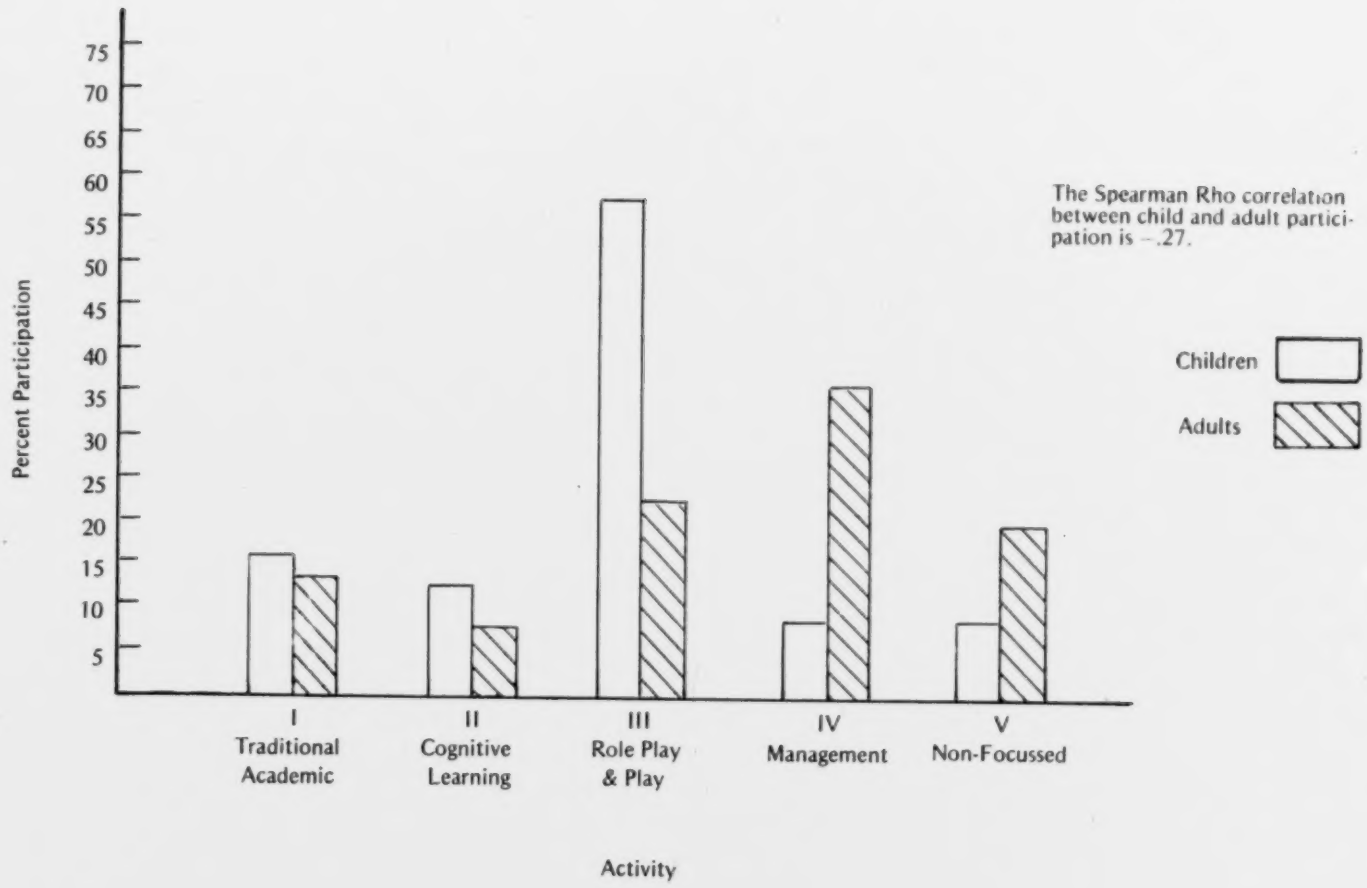

Figure 5. Location of Adults and Children by Activities in Low Rated Classroom.